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ABSTRACT

The literature of antonymy, though disjointed and inconclusive, has found that opposition is important to development, learning, psychological health, and creativity. To investigate the role of dialectics in cognitive processes and human learning, four empirical studies were undertaken. In study one, to investigate the dialectic process in affective assessment, subjects learned opposite and same word associations that had been paired for liked and disliked words. An analysis of the results showed that both the same and opposite groups showed a positive reinforcement value effect. In the second study, to investigate the relational ties between items, the previously used paired associations were modified to link nonsense syllables with four affirmations. High school and college subjects learned four affirmations for each of two root nonsense syllables. The results showed that both opposite and positive strategies facilitated learning. In the college sample, opposition was significantly more facilitative than all other strategies. In the third study, to investigate the linear quality of demonstrative reasoning, subjects learned triads of nonsense syllables from the middle range of associative strength. As in the other studies, a dialectical, oppositional strategy enhanced learning even in the absence of real semantic meanings. In the fourth study, an incidental learning paradigm using real words replaced the paired associate paradigm. Subjects learned the words intentionally or as part of an affective/nonaffective semantic task. The results showed that antonym pairs were recalled much better by the two semantic task groups. This research demonstrates the validity of investigating the dialectic construct and challenges the traditional associationistic and cognitive models of modern psychology. (BL)

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Dialectics and Meaning: The Effects of Opposition in Cognition and Learning

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ABSTRACT

The concept of dialectics, or oppositionality has not been extensively treated in the literature of human learning and cogntive psychology. Most research has focused on antonymy and its relation to synonymy and to learning performance. Explanations of the phenomenon have been offered based on lnaguage models. The lack of interest in the dialectic is due to the foundation of our modern cognitive sciences on the association psychology of the past, dating back to the time of Aristotle. The idea of oppositionality was entirely lost from psychological consideration when the law of contrast was reduced to a special case of contiguity.

This paper examines the relevant literature on the role of dialectics in cognitive processes and human learning. In addition new methodological approaches to studying dialectics in human cognition are presented. Empirical studies employing these new methods are described, and the results of the program of research are presented. Support is found for the effects of opposition in human cognition and learning which would not be predicted from traditional behavioristic and cognitive psychological theories.

Dialectics and Meaning: The Effects of Opposition in Cognition and Learning

Richard N. Williams

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The concept of dialectic, or oppositionality, has not been extensively researched in the literatures of human learning and cognitive psychology. This would seem to be the case because the concept of dialectical meaning and the process of dialectical reasoning do not fit neatly--if, indeed, at all--in the dominant models of either field. Work in human learning has been dominated by traditional associationistic psychology (see Warren, 1921, for a history of associationism). As originally formulated by Aristotle, association included the "law of contrast" as essential in accounting for learning. The British empiricists--notably, John Stuart Mill--and later empiricist learning theorists reduced contrast to a special case of similarity and/or contiguity (see, for example, Deese 1965, and McNeill, 1966). In this reduction, oppositionality and dialectic could be "accounted for," but they were no longer studied in their own right, and the dialectic was lost to contemporary psychology.

In more contemporary cognitive psychology, most research done relating to the dialectic has focused on oppositionality as a linguistic feature. Work has been directed toward the topic of

antonymy and its relation to synonymy and their differential effects on learning and other cognitive performance.

My purpose in this paper is to examine the relevant literature on the role of dialectics in cognitive processes and human learning. In addition, new methodological approaches to studying dialectical reasoning in human cognition will be presented along with the findings already available from our research which will illustrate the human capacity for dialectical thought. As a preface to this presentation, I should state the essential difference between the research we propose and that--what little there is--which has already been done. Succinctly put, the difference is that we, in our research, take the dialectic seriously where previous researchers have not. It is true that this is more a difference of perspective than of method or results. In defense I would suggest that all substantive differences in the social sciences are differences in perspective more than data. This leads us, however, into the theory-method confound which Dr. Rychlak has introduced elsewhere (Rychlak, 1981, 1977), and which is not the topic of our presentation.

It might be better to point out that whereas previous research has regarded oppositionality as an interesting type of association, or as an interesting aspect of a much larger linguistic system, our research has looked at the process of oppositional thought itself, and tried to find where it is manifested, and whether it is indeed

a natural modus operandi of the human mind. The central question is whether one views the dialectic as a product of complex processes and structures, or as a quality of humanity.

The Dialectic in Human Learning and Cognition

One of the best established findings in antonym research is that antonyms are the most common responses in word association tasks (Karowski and Schachter, 1948); response time is also shorter for opposites than for related words. However, in judging similarity or difference between pairs of words, similarity judgments are made faster than difference (oppositional) judgments.

When associations are made under extreme speed constraints, more antonym responses are given than under standard conditions (Siipola, Walker, and Kolb, 1955). When subjects are instructed to give antonym associates whenever possible, more popular (more frequently given) responses are given (Kjeldergaard, 1962). Similarly, when subjects are instructed to give more popular responses, the number of non-antonym responses increases (Wynne, Gerjouy, and Schiffman, 1965). It has thus been suggested that antonym responses reduce conceptual effort (see Pollio, 1974). Some investigators (Carroll, Kjeldergaard, and Carton, 1962; Moran, Mefferd, and Kimble, 1964) claim that subjects come to association tasks with a "set" to give antonym responses and that this set is correlated with a tendency to give rapid responses. It seems that,

rather than take dialectical thinking seriously, most researchers have elevated their observations to the status of explanations.

Kanungo (1967) reported negative transfer of learning effects for antonyms and positive transfer for synonyms. This finding was in contradiction, however, to earlier research findings (Bugelski and Cadwallader, 1956; Wemer, 1964) in which both synonyms and antonyms facilitated positive transfer, Osgood's (1946) empirical law of transfer, as well as later research (Wickens and Cermack, 1967; Weiss-Shed, 1977).

Osgood (1953) long ago suggested that antonym responses in word association are not mediated by semantic processes. They are somehow more direct. Based on studies of semantic generalization (Grossman and Eagle, 1970; Koplin, Moates, and Burroughs, 1968; Olson, 1965), it has been concluded by one investigator at least (Cramer, 1972, 1968) that antonymic and synonymic associations are not based on the same underlying processes.

Deese's (1965) explanation of antonymy is that it results from shared features between the words of the antonymic pair. The idea is that antonymic pairs have all features of meaning and grammar in common except one--the feature that denotes negation.

There is, however, considerable evidence that oppositionality does not reduce to a feature (Pollio, Dichtman, and Richards, 1969). Smith (1965), for example, reported that subjects took longer to deal with (interpret the meaning of) sentences changed

from active to passive voice, but no such increase in processing time was found for sentences containing oppositional changes in meaning. These results imply that opposition is different from a syntactic feature. Grossman and Eagle (1970) found that subjects made significantly more false recognitions to synonyms and associated words than to control words. No significant effect was observed for antonyms (see also Felzen and Anisfeld, 1970; Underwood, 1965; Anisfeld and Knapp, 1968). It has been suggested on the basis of such evidence (Anisfeld, 1970; Brewer and Lichtenstein, 1974) that memory for meaning (of which opposition is a part) is different from memory for semantic or syntatic features.

Kadesh, Riese, and Anisfeld (1976) showed that in a dichotic listening task, semantic relationships between the words in the two channels facilitated identification of the unattended words. The weakest effect was for antonyms. Lewis (1970) found that antonyms in the unattended channel interfered less with shadowing of the attended channel than other semantically related words.

Cramer (1973) and Mansfield (1977) presented findings which indicated that younger children made less use of opposition in organizing memory than did older children. Landaur and Paris (1976), however, criticized Cramer's (1973) methods for being too difficult for children to understand and for being vulnerable to demand characteristics. When these faults were corrected, second

and sixth graders were shown to use synonyms and antonyms about equally well.

Brewer and Stone (1975) present findings indicating that children learn the polarity of a dimension before they learn the dimension itself. For spatial antonyms, for example, it would appear that children can collapse all the dimensions to a generalized one of "bigness-littleness." For nonspatial antonyms, the authors suggested that there may exist a generalized dimension of positive-negative affect upon which basis judgments are made and meanings related (see also Heidenheimer, 1975). These findings suggest that facility in recognizing and using opposition emerges before specific dimensions of the opposition can be demonstrably articulated.

Related to the importance of opposition as an organizing and meaning-giving principle are the findings of Hogben and Jacobs (1972) that severe mental disturbance (schizophrenia) is correlated with an inability to use opposition as a valid cognitive organizing principle. Rothenberg (1973) has shown that creativity is associated with a tendency for frequent and rapid opposite responses in association tasks.

In summary, the literature on antonymy has been disjointed and inconclusive. It is clear only <u>that</u> something is happening in human cognition related to opposition. It is not at all clear <u>what</u> is happening. We can, however, suggest that

(a) opposite-responding is a common and strong tendency in association tasks; (b) relations of opposition usually have facilitating effects in learning; (c) the reduction of opposition to a feature does not seem to be valid; (d) opposition is meaningful very early in life; (e) the concept of oppositionality is grasped before specific semantic dimensions are defined; (f) the facility for identifying and using opposition is related to psychological health and creativity.

We must further conclude, however, that researchers in this field have not seriously considered the possibility of dialectical thought as a fundamental human attribute. Rather, findings about oppositionality have substituted for theories of oppositionality--observations have been raised to explanations. What research does exist (it is particularly rare during the past five years) is contradictory, and it stands in need of a theory to render it sensible.

We suggest that the fundamental reason for the lack of research on the dialectic is that it is extremely difficult for traditional associationistic and cognitive models to account for. Almost by definition, dialectical thinking violates--at least potentially--the established laws of learning and cognition. We will, therefore, present several research strategies which our research group has developed for studying dialectical thinking. These designs are firmly rooted in traditional methodology.

However, we have tried to get at the foundation of human dialectical capacity--we have taken it seriously--in such a way that it is difficult to refute within the very tradition whose methods we have borrowed. Our account of our findings must be radically different from previous accounts of cognitive-associationistic oppositionality.

New Methods for the Study of the Dialectic

Study I

The first of our attempts to study the dialectic and understand it (Williams, 1978) came out of research on affective assessment based on Rychlak's (see Rychlak, 1977) Logical Learning Theory. It has been well-documented that people tend to learn what they like faster and more readily than what they dislike. This is termed the RV effect (RV is reinforcement value). Logical Learning Theory (LLT) explains that meanings of materials to be learned are affectively assessed, and then positive meanings are extended--they become the precedent for the sake of which meaning is extended and learning takes place. It is fundamental to the theory that such affective assessment is ideographic, and that it is an inherently dialectical processes. The assessments are not products of the similarity and contiguity extant in experience, but they are manifestations of an innate and potentially arbitrary human capacity. The willful and free nature of the assessment derives from the human capability for dialectical thought.

We wanted to demonstrate in our research that affective assessment is truly a dialectical process. Subjects rated as liked or disliked a set of personality-related adjectives from Anderson's (1968) list. The words had opposites, but subjects rated only one pole of the oppositional dimension. One group of subjects (the Same group) learned pairs of the actual words they had rated. Another group (the Opposite group) learned the opposites of words they had rated--i.e., words they had never actually seen in the study. A third group (the Control group) learned the same lists as the Opposite group even though they had made no ratings, and thus had no ideographic meaning attached to those particular words.

The learning task was a paired associate task consisting of six pairs of liked and six pairs of disliked words for the Same group, six pairs of opposites of liked and six pairs of opposites of disliked words for the Opposite group, and this same list for the Control group. We predicted that the Same group would learn liked pairs more readily than disliked, and that the Opposite group would learn opposites of disliked more readily than opposites of liked. In other words, the effects of affect on learning are just as predictable from the opposites of words as from the words themselves. The performance of the Control group is a test for the effects of the words themselves--because the same words tended to be in the learning lists of both the Same and the Opposite groups,

and our hypothesis predicted similar performance on the same words for the two groups.

True to predictions the Same group and the Opposite group showed a positive RV effect. The Control group exhibited no tendency to learn one group of words more readily than the other. Figure 1 illustrates the pattern or results. Tests of simple effects were significant for the Same and Opposite groups but not for the Control group.

Insert Figure 1 about here

We conclude that affective assessment is truly a dialectical and an ideographic process, that predictions can be made and tested from a dialectical framework, and the effects of affect and opposition derive from qualities of people rather than qualities of particular words.

Study 2

In this study (Rychlak and Williams, 1983) we wanted to investigate the relational ties between items of a paired-associate learning task. Rather than looking merely at the final results, we wanted to examine the effects of various relational--or affirmational--strategies, including an oppositional one. The method of paired associations was modified, yielding what we have called the method of "triassociation." Rather than having subjects

learn some vague affirmation such as "goes with," we gave them four different affirmational instructions. Nonsense syllables were to be related by four affirmations--Always, an unconditional affirmation, Never, a negative affirmation, Sometimes, a conditional affirmation, and Opposite, an oppositional (dialectical) affirmation. We predicted that unconditional affirmation would facilitate learning most, and that, because oppositionality is also strong--based on the human capacity for dialectical thinking--the oppositional affirmation would be equally facilitative.

Each subject learned four affirmations for each of two root nonsense syllables. This yielded a learning list consisting of eight triassociations for each subject. The learning trials were carried out as in a standard paired-associate learning task. Adequate controls were designed for associative strength of the nonsense syllables, the order of presentation of the triassociations, and the individual pairings of the nonsense syllables. The results are summarized in Figure 2 for two samples, one from a high school population and one from a college population. The dependent measure in the study was percent hits--that is, on how many of the total trials were each of the nonsense syllables in the second position correctly anticipated. As seen in Figure 2, in both samples, the Opposite affirmation strategy facilitated learning as much as the Always strategy. In

the college sample, Opposition was significantly more facilitative than all the other strategies.

Insert Figure 2 about here

We must point out here that there is no inherent oppositional property in nonsense syllables. The effects of the oppositional affirmation could not be accounted for by properties of the materials themselves. Rather, there seems to be something facilitative in employing dialectical affirmational strategies in learning even in extremely contrived situations.

Study 3

Our third research strategy involved a modification of the method of triassociation. We (Williams and Schoemaker, 1983) wanted to see whether the superiority of an oppositional strategy over a nonoppositional but unconditional affirmational strategy could be conceptually validated. We also wanted to try and get at the linear quality of demonstrative reasoning and contrast it with the bipolar nature of dialectical reasoning. Originally we had interest in investigating the Kellyan notion of a construct to see whether we could create a synthetic construct from nonsense syllables which would be readily learnable.

We created, therefore, triads of nonsense syllables taken from the middle range of associative strength. The triads were then

related in three different ways. A linear, demonstrative string of three nonsense syllables was created by linking them with the word "similar" (e.g., HIB similar LAT similar ZAC). These were designated Similar-Similar triads. A dialectical, nonlinear string was created by linking the syllables with "opposite" (HIB opposite LAT opposite ZAC), yielding Opposite-Opposite triads. A mixed (Kellyan) string was created by linking the first two syllables with "similar" and the last syllable to the second with "opposite" (HIB similar LAT opposite ZAC). These were the Similar-Opposite triads. The learning list consisted of six triads with their affirmation words--two triads of each type. Order effects and pairing effects were randomized through the design. The learning trials were conducted as in a regular paired-associate learning task to a criterion of two errorless anticipation trials. Our dependent variables were total trials to criterion and percent hits for each triad type. The two measures yielded comparable results. Figure 3 presents the results of the percent hits analysis. Again, a dialectical, oppositional strategy enhanced learning even in the absense of real semantic meanings. The Similar-Opposite triads were learned with greatest difficulty. We suggest that this is due to the necessity of employing two strategies rather than one. It would seem that we were not successful in creating synthetic Kellyan constructs. Research currently underway is aimed at

employing real constructs--using meaningful words--in a similar research design.

Insert Figure 3 about here

The results of this study suggest that an oppositional, nonlinear affirmational strategy is more facilitative to learning than a linear, demonstrative strategy.

Study 4

In study four (Williams and Williams, 1982) we employed an incidental learning paradigm rather than a paired-associate paridigm. Our learning materials were real words rather than nonsense syllables. Recent work in incidental learning has been aimed at clarifying the concept of "depth of processing" (Craik and Lockhart, 1972). The design involves giving different groups of subjects different incidental tasks to perform in relation to a list of words. One group is asked to learn the words intentionally; another group is given a semantic task, usually to rate the words for pleasantness; another group is given a nonsemantic task, such as estimating the number of consonants. The usual finding is that the semantic task leads to a level of learning roughly equivalent to that of the intentional group and superior to the nonsemantic group.

In our study we wanted to investigate any differences between affective and nonaffective semantic tasks, so we had a group which rated the words for like and dislike, a group which rated for concreteness and abstractness, one which estimated the number of letters, and an intentional learning group. The words used were taken from a study by Hyde and Jenkins (1969) and consisted of six antonym first associate pairs and six nonantonym first associate pairs. Our dependent measure was the number of antonym and nonantonym pairs recalled.

Insert Table 1 about here

Table 3 shows the results of the study. Antonym pairs were recalled much better by the two semantic task groups. We have no explanation of why the intentional group recalled fewer words overall. We can conclude, at least, that the oppositional or non-oppositional pairs made no difference for them. Neither did the nonsemantic task group avail themselves of the dialectical information available in the words. Figure 4 illustrates the interaction between incidental task and oppositional or non-oppositional word pairs.

Insert Figure 4 about here

We would summarize the results of this study by emphasizing that the dialectical relationships in the words were apprehended and utilized by subjects who were dealing with them in terms of their meaning. Again, this is more a capacit of the subjects for thinking dialectically than a capacity of stimulus objects to elicit certain demonstratively prescribed reactions.

Conclusion

We are currently engaged in further research on our human capacity for dialectical thinking. We are confident that the dialectic as a construct can be validated employing the traditional methods of scientific psychology. Investigation of dialectical thinking is essential for an understanding of beings who are innately dia ectical. Such investigation presents a difficult challenge for the traditional associationistic and cognitive models of modern psychology.

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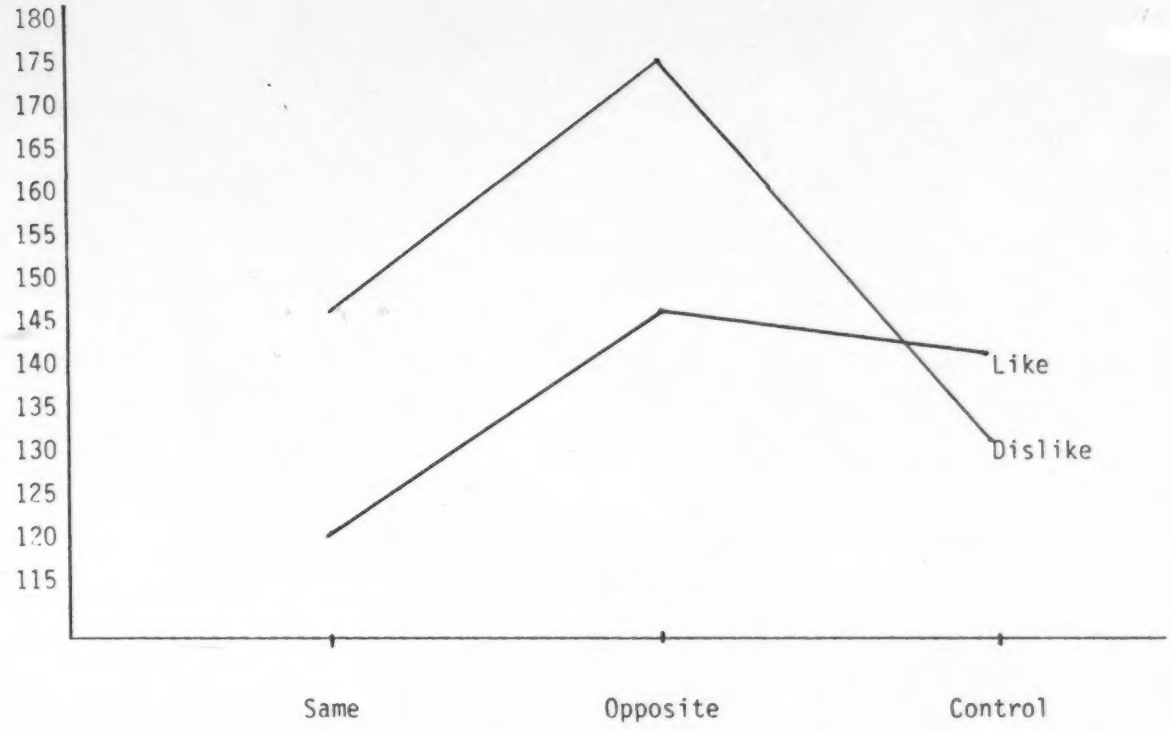

Figure 1

Trials to Criterion as a Function of Groups and Reinforcement Value

(RV x group interaction, p = .005)

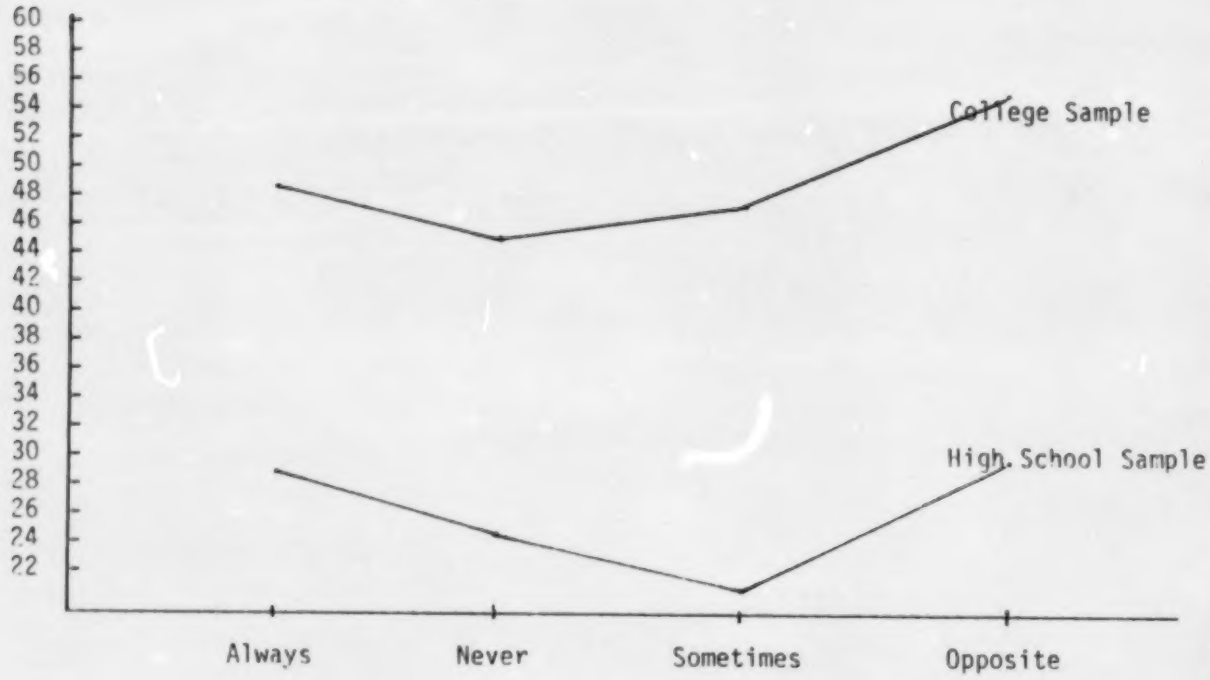

Figure 2

Percent Hits Score as a Function of
Affirmation Instruction
(Association)

Main effect for affirmation instruction = .008 (H.S.), .001 (College)
Simple effects: Always and Opposite > Sometimes $p < .05$ (H.S.)
Opposite > Always, Never, Sometimes $p < .05$ (College)

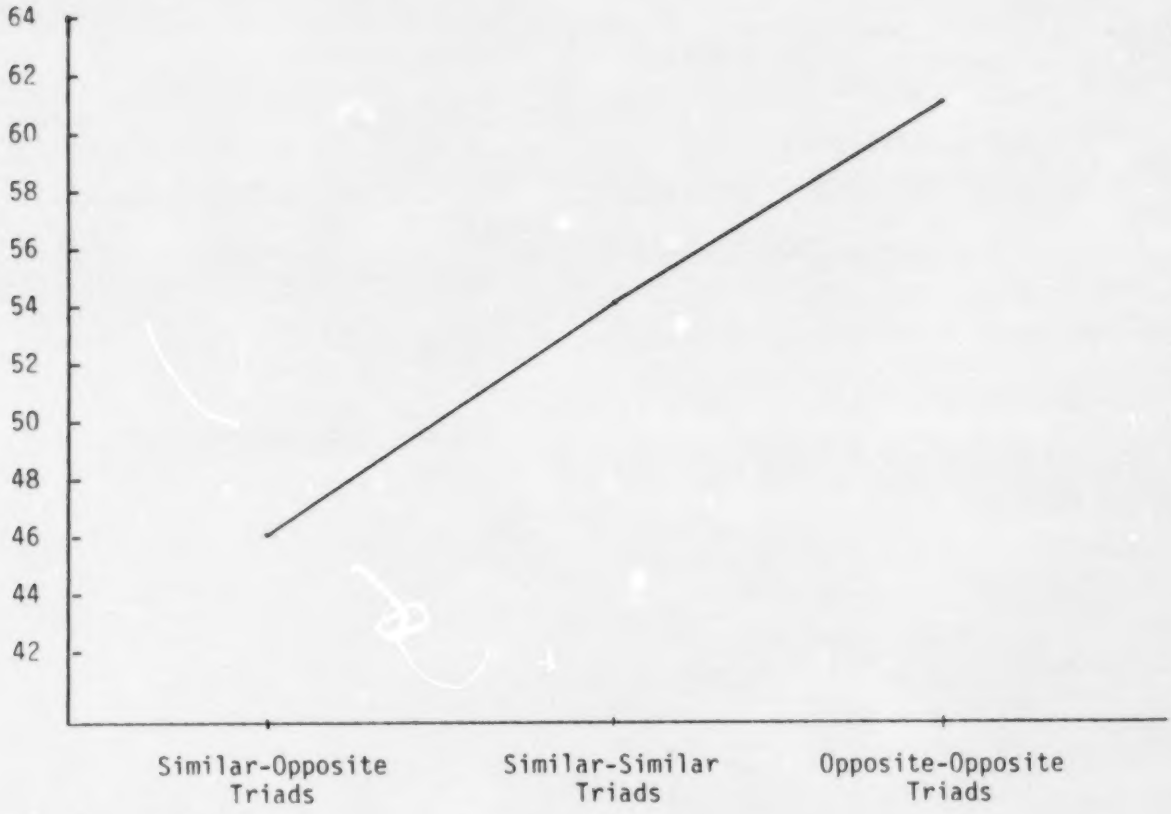

Figure 3

Percent Hits Score as a Function of Triad Type

Main effect for triad type $p < .002$
Simple effects all significant, $p < .05$

Table 1

Mean Recall Scores of
First-Associate and Antonym Pairs for
Intentional Group and Three Incidental Groups

	GROUPS			
	Like-Dislike	Concrete-Abstract	Letter Task	Intentional
First Associate Pairs	2.90*	1.36*	1.55	1.46
Antonym Pairs	4.46*	3.46*	2.18	1.64

*Means for first-associate pairs and antonym pairs are significantly different for these groups according to tests of simple effects, $p < .05$.

Figure 4

Mean Recall Scores of
First-Associate and Antonym Pairs by
Intentional Group and Three Incidental Groups